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ABSTRACT

This manual is a resource guide on energy conservation for the teaching of health education. It contains 12 student activities which are grouped into four goal oriented units. The main objectives of the project are to increase the student's understanding that: (1) Natural laws limit energy availability; (2) Energy consumption affects both man and his environment; (3) Human values and attitudes affect energy usage; and (4) Energy consumption is necessary to maintain our life style. (SB)

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IDAHO
ENERGY CONSERVATION RESOURCE GUIDE
for
HEALTH EDUCATION GRADES 7-12

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TABLE OF CONTENTS

	Page
Introduction	1
Health Education Statement	2
Project Goals	3
Energy Attitude Survey	5
Goal 1: Natural LAWS determine the availability of energy	
Activity 1	7
Activity 2	8
Goal 2:USE of Energy affects both people and their environment	
Activity 1	9
Activity 2	9
Activity 3	10
Activity 4	10
Activity 5	11
Activity 6	12
Goal 3: Our VALUES determine how we use energy	
Activity 1	13
Goal 4: ENERGY CONSERVATION is necessary to maintain our quality of life	
Activity 1	14
Activity 2	14
Activity 3	15
Glossary	17
Bibliography	25

"The Energy Crisis can be the most effective teaching aid of the decade."

S. David Freeman
Commissioner
Tennessee Valley Authority

INTRODUCTION

In recent years Idahoans have become increasingly concerned about the energy situation and aware of the importance of energy in our lives. Experts now tell us that unless some immediate steps are taken we will not be able to provide for our future energy needs as a nation. New research and technology can alleviate part of the problem but, more immediately. We must reduce energy use. An effective energy conservation program can result in substantial energy savings, extend the life of present energy supplies, and provide us the much needed time to explore alternatives.

Traditionally, the educational system of our country has been called on to explore and resolve societal problems. The energy situation is a unique opportunity for educators since it reflects a complex set of problems that require changes in values, attitudes and lifestyles. The instructional program in a school can examine these problems and can assist in student awareness of the alternatives and consequences of energy decisions.

This resource guide has been prepared to assist teachers in incorporating energy concerns within the school curriculum. It is intended to provide a basic framework of objectives for different subject areas and to provide examples of activities for teaching towards the stated objectives. Resources are listed to aid the teacher in developing additional activities. It is anticipated that these materials will be a starting point and that teachers will go farther in this important area of instruction.

HEALTH EDUCATION

Personal health practices, and the availability of health services, depend upon the availability of energy. Consequently, this resource guide emphasizes the close relationship between energy and health.

The following health skills and concepts are included in this guide:

1. Energy is necessary for the delivery of health services.
2. Community environment affects personal energy habits and attitudes.
3. Personal energy use affects the environment.
4. The ability to make, and to put into effect, intelligent decisions about health related energy problems.

IDAHO ENERGY CONSERVATION RESOURCE GUIDE

PROJECT GOALS

This project has four goals. They are easily recalled by the following acronymn:

LUV Energy Conservation

LUV represents the key words in the first three goals.

These key words are:

1. Laws
2. Use
3. Values

The fourth goal is Energy Conservation.

Goal 1. Natural LAWS determine the availability of energy.

There are conditions and limits to our use of energy. Activities under this goal describe what energy is, what forms it takes, and how it can be converted from one form to another. These activities emphasize that all earth's resources are limited.

Goal 2. USE of energy affects both people and their environment.

Everyone depends upon energy. Activities under this goal examine how energy use affects both our natural environment and our economic, political and cultural systems. These activities emphasize that energy use influences the lifestyle for both present and future generations. Lifestyle, in turn, is influenced by our choice of technology.

Goal 3. Our VALUES determine how we use energy.

Energy problems can not be solved by technology alone. Activities under this goal encourage us to analyze our personal energy habits and to accept the responsibility for our actions. They emphasize that changes in energy use and changes in values and attitudes are interrelated. These activities offer us some tools for gathering information, for making decisions, and for providing input to our economic, political and cultural systems.

Goal 4. ENERGY CONSERVATION is necessary to maintain our lifestyle.

There are both long-run and short-run solutions to energy problems. Activities under this goal encourage the development of both new energy sources and of more efficient ways to use energy. They emphasize that energy conservation is an effective and essential tool.

Teacher Note: Use this as a pre and post survey to see if the study of this material has affected change in student attitudes.

ENERGY ATTITUDE SURVEY

1. Do you believe there is an energy shortage? ___yes ___no ___don't know

2. Do you believe you have been given a realistic picture of the energy situation facing the United States? ___yes ___no ___don't know

3. Do you believe most Americans are energy "wasters"? ___yes ___no ___don't know

4. Do you believe most Americans are energy "conservers"? ___yes ___no ___don't know

5. Do you belive Americans are "spoiled", self indulgent, and reluctant to take responsibility for the future? ___yes ___no ___don't know

6. Do you believe it is the responsibility of every U.S. citizen to conserve energy voluntarily? ___yes ___no ___don't know

7. Do you believe Americans will conserve energy only when government controls are imposed? ___yes ___no ___don't know

8. Would you be willing to reduce your standard of living to conserve energy? ___yes ___no ___don't know

9. Do you believe you as an individual can make an impact on energy consumption? ___yes ___no ___don't know

10. Would you conserve energy to save energy? ___yes ___no ___don't know

11. Do you think the money saved is worth the inconvenience of conserving energy? ___yes ___no ___don't know

12. Do you think the energy saved is worth the inconvenience of conserving energy? ___yes ___no ___don't know

13. Do you feel technology will "bail us out" of the energy shortage?

14. Do you feel you have any input or participation in the energy usage decisions made by your family? ___yes ___no ___don't know

15. Are you going to do something to save energy? ___yes ___no ___don't know

Take a tally of the Energy Attitude Survey and find the percentages for each response.

GOAL 1: NATURAL LAWS DETERMINE THE AVAILABILITY OF ENERGY.

Activity 1

Objective: The student will be able to identify types and extent of food sources available for human consumption.

Resource: Energy Conservation in the Home - An Energy Education/ Conservation Curriculm Guide for Home Economics Teachers.

Procedure: 1. Name the four food groups and their contribution to human energy.

2. Discuss how food is converted into human energy within the body.

Activity 2

Objective: The student will be able to demonstrate that energy can be transformed from one form to another.

Resource: Library resource - Ask for information using wind energy. Write to:

Public Information Division 3161
Sandia Laboratories
Alberquerque, New Mexico 87115

Project Weathervane
Seattle City Light Brochure
1015 Third Ave.
Seattle, Washington 98114

Procedure: This activity can be used to motivate the students to trace power (movement of air) back to its original energy source (the sun) and speculate on further uses of this mechanical energy.

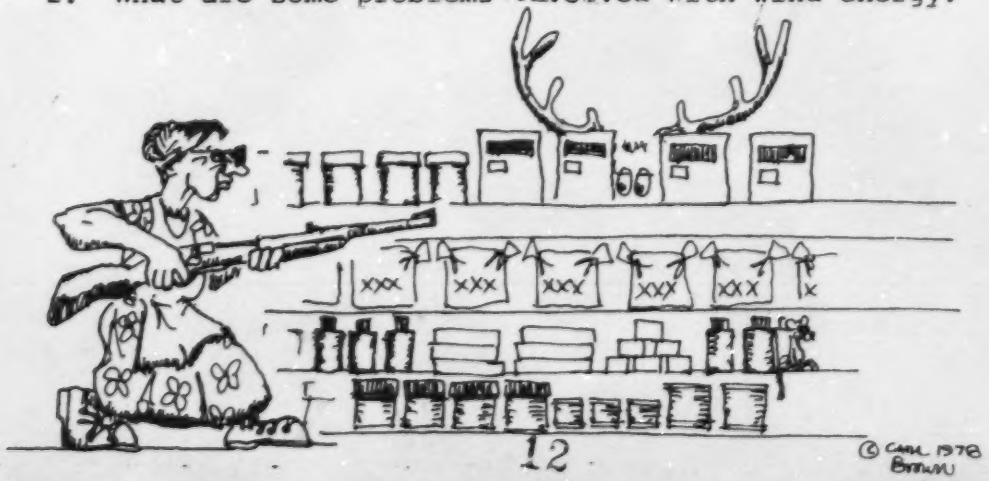
Since energy cannot be created or destroyed, let the students trace the energy pathway backwards as far as they can. We usually regard the sun as the ultimate energy source, but is the sun "creating" energy or just changing its form?

Have the students construct several pinwheels from plastic over-head projector sheets, a pin and a small stick (a pencil will do).

Go outside and demonstrate the production of mechanical energy. Look for the windiest spots on the schoolyard and experiment with wind speed at various elevations such as on the fire escapes as opposed to ground level.

The rotating pinwheel is mechanical energy. In what ways can this energy now be used? LET THE STUDENTS USE THEIR IMAGINATIONS.
Discuss the following questions:

1. Can a house be supplied with all its energy from a giant pinwheel.
2. What are some problems involved with wind energy?



GOAL 2: USE OF ENERGY AFFECTS BOTH PEOPLE AND THEIR ENVIRONMENT.

Activity 1

Objective : The student will be able to explain how different energy sources affect both the individual and the community.

Reource: Library resource

Procedure: Working in small groups, research energy sources. List five (5) sources of energy (hydro electric, gas, solar, nuclear, coal etc.) and describe how they affect personal lifestyle and community environment. Have one member of each group give an oral report to the rest of the class. Students may contrast lifestyles in two real or imaginary communities based on the different sources of energy in each community.

Activity 2

Objective: The student will be able to explain how citizens can influence industry's involvement with energy problems.

Resource: Local Community Resources

Procedure: Students will list industry's contribution to the energy problem. They will make proposals as to how one citizen or group of citizens can influence industry to make necessary changes in reducing energy consumption and pollution.

Activity 3

Objective: The student will determine how personal energy usage can affect personal environment.

Resource: Home Resources

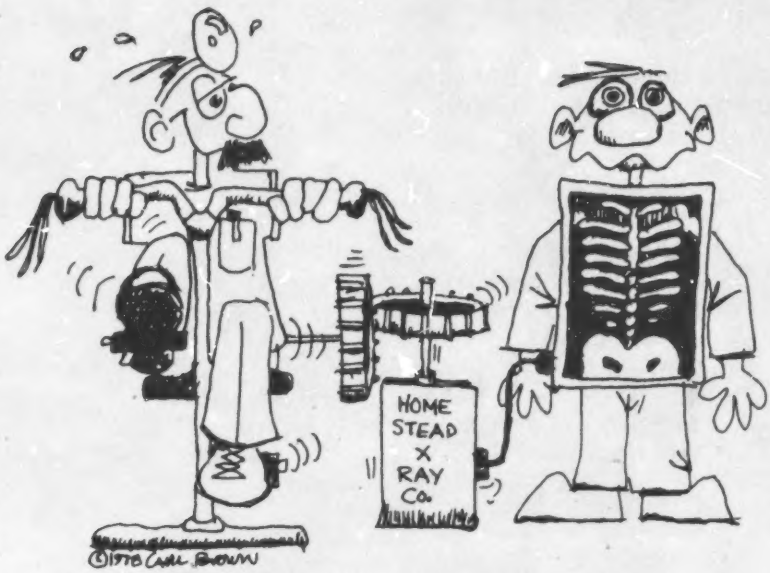
Procedure: Students individually list all the types of energy they personally use. Then have them select one kind (i.e. electricity) and describe what its presence or absence can mean to their own lives (home, recreation, travel, surroundings, water, air).

Activity 4

Objective: The student will be able to identify ways in which the quality of the environment affects personal health.

Resources: Library resources

Procedure: Have students research and report on how the environment can cause or contribute to respiratory diseases and infections (i.e. asthma, bronchitis, lung cancer, etc). Discuss local sources of air pollution and what individuals can do to reduce the affects of air pollution.



Activity 5

Objective: The student will Identify ways in which future shortages of energy could affect the availability of personal health services (hospitals, health departments, Physicians, etc.)

Resources:

Procedure:

1. Make a list of those health services which require energy and then discuss what might possibly happen if the energy weren't available. (Hospitals, emergency services, sewage treatment/water treatment plants).

2. Write a story about a future time when there isn't enough energy. Describe what happens to the services offered by physicians and hospitals and what happens to the community.

3. Have a representative from a nearby hospital talk about the cost of energy in a hospital, and what health services and equipment use the most energy.

Activity 6

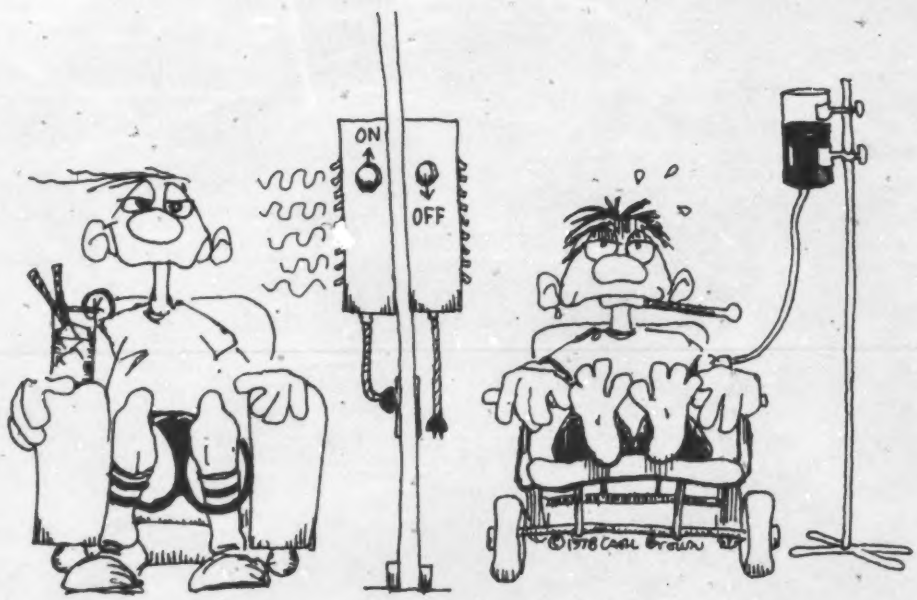
Objective: The student will determine his/her own personal energy usage and the impact of this use on the community's environment both now and in the future.

Resource: Energy Conservation in the Home

Procedure:

1. Have students individually list the forms of energy used at home every day and share with other members of the class to compare. Where does this energy come from?

2. As a group, list the types of energy now used by class members. What might happen if they were to disappear, or become too expensive to use any longer?



GOAL 3: OUR VALUES DETERMINE HOW WE USE ENERGY.

Activity 1

Objective: The student will be able to explain and take part in social processes that make decision about energy use.

Resource: Interdisciplinary Student/Teacher Materials in Energy, the Environment, and the Economy, National Science Teachers Association, 1742 Connecticut Ave., N.W. Washington, D.C. 20009.

Procedure:

1. Discuss who enacts energy laws - how and why?
2. Discuss how new energy measures could be implemented at home and in the community (consider impact on community, home, and on the individual). Consider education and legislation, or economic measures.
3. Students research and write a law on automobiles and gas-use in order to conserve petroleum.
4. Research and write a proposal to encourage drivers to decrease the use of personal transportation and begin to rely on public transportation.
5. Have students develop and produce pamphlets on various energy topics for public information - using public transportation, using electricity, saving energy in the home, energy and health, etc.
6. Contact the following to speak on energy and what they are proposing to do: County Commissioners, Environmental Protection Agency, Department of Health and Welfare Environmentalists, District Health Department Environmentalists, Department of Transportation and others.

GOAL 4: ENERGY CONSERVATION IS NECESSARY TO MAINTAIN OUR QUALITY OF LIFE

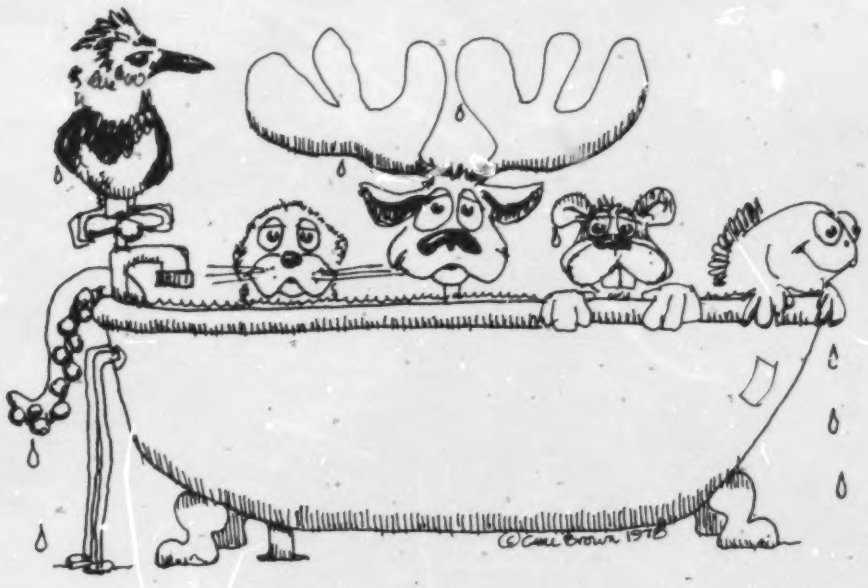
Activity 1

Objective: The student will identify ways in which future lack of energy could affect community safety (lighting, traffic devices, emergency services, communications)

Resource:

1. Stage an emergency and have students act it out. Afterwards ask students to discuss how they might handle the situation if little or no energy were available.

2. Discuss what kinds of safety problems might occur most often and which ones might occur least (traffic accidents, plane crashes, industrial accidents, etc.)



Activity 2

Objective: The student will be able to describe how an energy shortage will affect the availability of water.

Resources: Local Sewage or Water Treatment Plant. District Health Department.

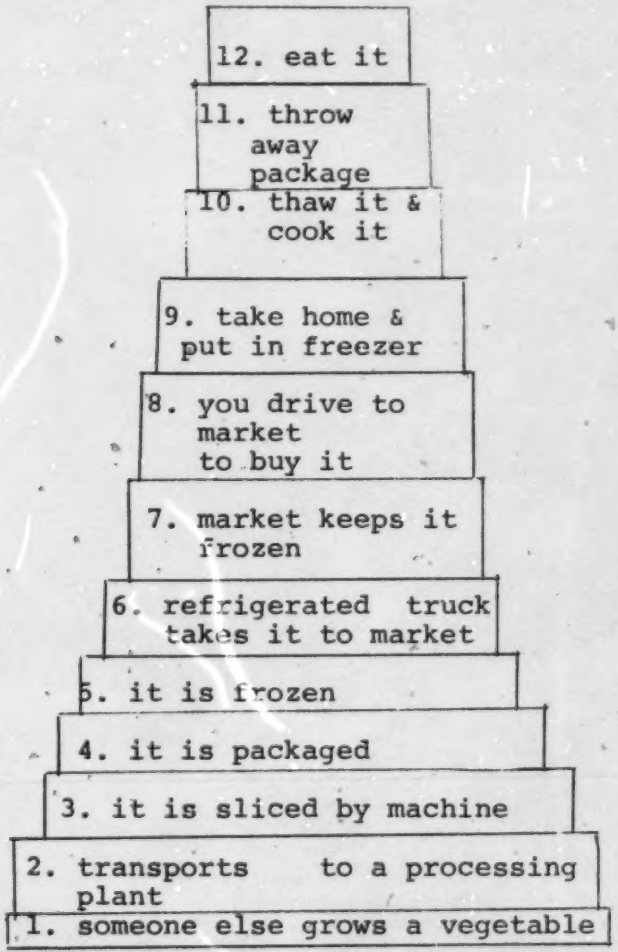
Procedure: Trace and discuss the steps required to supply water and maintain its purity. Where is energy required the process?

Activity 3

Objective: The student will identify the various energy-consuming steps in the food system and decide upon the different ways in which energy can be saved.

Resource: Energy Conservation in the Home

Procedure: Twelve areas in a food system are listed below for a frozen vegetable. Which steps could be eliminated to to save energy?


12. eat it
11. throw away package
10. thaw it & cook it
9. take home & put in freezer
8. you drive to market to buy it
7. market keeps it frozen
6. refrigerated truck takes it to market
5. it is frozen
4. it is packaged
3. it is sliced by machine
2. transports to a processing plant
1. someone else grows a vegetable

Construct the food chain steps for a canned soft drink and then make suggestions for steps which might be eliminated to save energy.

Suggestions: This type of visual representation makes a nice bulletin board display.

Possible answers:

(a)

6. eat it
5. take it home and cook it
4. you drive to market and buy it
3. refrigerate it at the market
2. transports it to market
1. someone else grows a vegetable

(b)

3. eat it
2. cook it
1. grow a vegetable in your own garden

(c)

2. eat it raw
1. grow a vegetable in your own garden

GLOSSARY

ACCELERATION. The time rate of change of velocity in either speed or direction.

ALTERNATING CURRENT (AC). An electric current whose direction of flow is changed at periodic intervals (many times per second).

ATOM. The smallest particle of an element which can enter into a chemical combination. All chemical compounds are formed of atoms, the difference between compounds being attributable to the nature, number, and arrangement of their constituent atoms.

ATOMIC ENERGY. The constitutive internal energy of the atom which was absorbed when it was formed; Energy derived from the mass converted into energy in nuclear transformation.

BLACKOUT. A total power failure caused unintentionally by storm damage, equipment failure, or overloaded utility equipment. An exceptional situation in which all power is deliberately cut off by electrical generating facilities.

BLANKET INSULATION. Cotton fiber, mineral wool, or wool fiber made into varying thinknesses in a length.

COAL. Solid, combustible, organic hydrocarbon formed by the decomposition of vegetable material without free access to air.

COAL GASIFICATION. The conversion of coal to a gas suitable for use as a fuel.

COMBUSTION. Burning; technically, a rapid oxidation accompanied by the release of energy in the form of heat and light. It is one of the three basic contributing factors causing air pollution. The other are attrition and vaporization.

COMFORT ZONE. The proper temperature, humidity, and air movement to create a feeling of comfort.

CONDUCTOR (ELECTRICAL). A material capable of carrying an electrical current.

CONSERVATION. The care or management of natural resources.

CONSERVATION OF MATTER AND ENERGY (LAW OF). The sum of the potential and kinetic energy of an ideal energy system remains constant.

CONSERVE. To manage or use wisely.

CONVECTION. The transfer of energy by moving masses of matter, such as the circulation or a liquid or gas.

CONVENTIONAL HYDROELECTRIC PLANT. A hydroelectric power plant that utilizes streamflow only once as the water passes downstream, as opposed to a pump-storage plant which recirculates all or a portion of the streamflow in the production of power.

CRUDE OIL. Liquid fuel formed from the fossils of animals and plants; petroleum as it comes from the ground.

CURRENT (ELECTRIC). The rate of transfer of electricity.

CURTAILMENT. Cutting back the use of energy resources as opposed to conserving or wisely using energy resources.

DIRECT CURRENT (DC). An electric current that flows in only one direction through a circuit.

DIRECT ENERGY CONVERSION. The process of changing any other form of energy into electricity without machinery that has moving parts. For example, a battery changes chemical energy into electricity by direct energy conversion.

DOUBLE GLAZED WINDOW. Two panes of glass factory-sealed together with a small air space between them. Double glazing has about twice the R-value of single glazing.

EFFICIENCY. The ratio of the useful work performed to the amount of energy used in the process.

ELECTRICAL ENERGY. The energy associated with electric charges and their movements. Measured in watt hours and kilowatt hours. One watt-hour equals 860 calories.

ELECTROCHEMICAL CELL. A cell in which chemical energy is converted to electric energy by a spontaneous oxidation-reduction reaction.

ELECTRON. The electron is a small particle having a unit of negative electrical charge, a small mass, and a small diameter. Every atom consists of one nucleus and one or more electrons.

ELEMENTS. Elements are substances which cannot be decomposed by the ordinary types of chemical change, or made by chemical union.

ENERGY. The capability of doing work. Potential energy is energy due to position of one body with respect to another or relative parts of the same body. Kinetic energy is due to motion.

ENTROPY. Entropy is the capacity factor for isothermally unavailable energy. Every spontaneous process in nature is characterized by an increase in the total entropy of the bodies concerned in the process.

ENVORONMENT. The sum of all external conditions and influences affecting the life, development, and ultimately the survival of an organism.

FIRST LAW OF THERMODYNAMICS. (Also called the Law of Conservation of Energy). Energy can be neither created nor destroyed.

FISSION. A nuclear reaction from which the atoms produced are each approximately half the mass of the parent nucleus. In other words, the atom is split into two approximately equal masses. There is also the emission of extremely great quantities of energy since the sum of the masses of the two new atoms is less than the mass of the parent heavy atom. The energy released is expressed by Einstein's equation, $E = Mc^2$.

FLYWHEEL. A method of energy storage working on the principle of a spinning wheel. By its inertia, a spinning wheel stores mechanical energy.

FOAM INSULATION. (1) Styrofoam; (2) Rigid foam boards; or (3) Liquid foam insulation.

FOSSIL FUELS. Coal, oil, natural gas, and other fuels originating from geologic deposits of ancient plant and animal life depending on oxidation for release of energy.

FUEL. A substance used to produce heat energy, chemical energy by combustion, or nuclear energy by nuclear fission.

FUEL CELL. A device in which fuel and oxygen are combined to produce chemical energy that is converted directly into electricity.

FUSION (ATOMIC). A nuclear reaction involving the combination of smaller atomic nuclei or particles into larger ones with the release of energy from mass transformation. This is also called a thermonuclear reaction by reason of the extremely high temperature required to initiate it.

FUSION, A reaction in which light nuclei combine to form an atom with greater mass.

GAS. A state of matter in which the molecules are practically unrestricted by cohesive forces. A gas has neither definite shape nor volume.

GASOLINE. Mixture of hydrocarbons obtained from petroleum.

GENERATOR. A device that converts heat or mechanical energy into electrical energy.

GEOTHERMAL. As applied to power generation, the use of heat energy obtained through the medium of hot water or steam coming from beneath the earth's surface.

GEOTHERMAL ENERGY. The heat energy available in the earth's subsurface believed to have been produced by natural radioactivity. The thermal gradient of the earth's crust is such that the temperature in a deep well or mine increases by about $1^{\circ}F$ for each 100 ft. of depth.

GRAM. A unit of mass in the metric system; the standard kilogram.

GREENHOUSE EFFECT. A method of using solar radiation to warm underheated areas (window treatments are opened to allow the window to admit and trap the sun's heat).

GROSS NATIONAL PRODUCT (GNP). A measure of economic activity which is the total market value of all goods and services produced in a country. Depreciation and other allowances for capital consumption are not deducted.

HEAT. Energy possessed by a substance in the form of kinetic energy, usually measured in calories or, in space heating, by the British thermal unit. Heat is transmitted by conduction, convection, or radiation.

HEAT CAPACITY. That quantity of heat required to increase the temperature of a system or substance one degree of temperature. It is usually expressed in calories per degree Celsius.

HEAT ENERGY. Energy that causes an increase in the temperature of an object. It may change the object from solid to liquid or from liquid to gas.

HEAT PUMP. A device that absorbs heat from the outside air and pumps it into the house. It works in reverse as a standard air conditioner for cooling.

HORSEPOWER. A unit that measures the rate at which energy is produced or used. A man doing heavy manual labor produces energy at the rate of about .08 horsepower.

HYDROELECTRIC PLANT. An electric power plant in which the turbine-generators are driven by falling water.

HYDROELECTRICITY. Electricity production by water-powered turbine generator.

HYDROLOGY. The science dealing with the properties, distribution, and circulation of water and snow.

HYDROPOWER. Power by falling water.

INSULATION. A substance that insulates is one that can slow down the flow or heat or sound.

INTERNAL COMBUSTION ENGINE. Energy is supplied by a burning fuel which is directly transformed into mechanical energy by controlled combustion.

JOULE. A metric unit of work or energy; the energy produced by a force of one newton operating through a distance of one meter.

KILOCALORIE. Heat energy equal to 4.19 x 10^3 joules.

KILOVOLT (KV). 1,000 volts.

KILOWATT (KW). The unit of power equal to 1,000 watts, 3.413 Btus, or 1,341 horsepower. Roughly, the power of one kw is capable of raising the temperature of a pound (pint) of water 1°F in one second.

KILOWATT-HOUR (KWH). The amount of work or energy delivered during the steady consumption of one kilowatt of power for a period of one hour; equivalent to 3.412 Btus.

LIGHT. Radiant energy which an observer can see.

LIQUIFIED NATURAL GAS (LNG). Natural gas that has been changed into a liquid by cooling to about -260°F (-160°C) at which point it occupies about 1/600 of its gaseous volume at normal atmospheric pressure; thus, the cost of shipping and storage is reduced.

MECHANICAL ENERGY. The kind of energy that is released to make objects move.

MEGAWATT (MW). A unit of power equal to 1,000 kilowatts or one million watts.

METHANE. Colorless, nonpoisonous, and flammable gaseous hydrocarbon; emitted by marshes and by dumps undergoing decomposition.

NATURAL GAS. Naturally-occurring mixtures of hydrocarbon gases and vapors occurring naturally in certain geologic formations; usually found associated with oil.

NONRENEWABLE RESOURCES. Depletable energy resources such as the fossil fuels - coal, gas and oil.

NUCLEAR ELECTRIC POWER PLANT. One in which heat for raising steam is provided by fission rather than combustion of fossil fuel.

NUCLEAR (ATOMIC) FUEL. Material containing fissionable uranium of such composition and enrichment that, when placed in a nuclear reactor, will support a self-sustaining fission chain reaction and produce heat in a controlled manner for process use.

NUCLEAR POWER. Electric power produced from a power plant by converting the energy obtained from nuclear reaction.

NUCLEAR POWER PLANT. Any device, machine, or assembly that converts nuclear energy into some form of useful power, such as mechanical or electrical power. In a nuclear electric power plant, heat produced by a reactor is generally used to make steam to drive a turbine that, in turn, drives an electric generator.

NUCLEAR REACTION. A reaction involving a change in an atomic nucleus, such as fission, fusion, neutron capture, or radioactive decay, as distinct from a chemical reaction, which is limited to changes in electron structure surrounding the nucleus.

OFF-PEAK. Energy supplied during periods of relatively low system demands.

OIL SHALE. Sedimentary rock containing solid organic matter (kerogen) that yields substantial amounts of oil when heated to high temperatures.

OIL SPILL. The accidental discharge of oil into oceans, bays, or inland waterways. Methods of oil spill control include chemical dispersion, combustion, mechanical containment, absorption.

OPEC (Organization of Petroleum Exporting Countries). An organization of countries in the Middle East, North Africa, and South America which aims at developing common oil-marketing policies.

PEAKING. Power plant operation to meet the highest portion of the daily load.

PEAKING CAPABILITY. The maximum peak load that can be supplied by a generating unit, station, or system in a stated period of time. For a hydroproject, the peaking capability would be equal to the maximum plant capability only under favorable pool and flow conditions. Often the peaking capability may be less due to reservoir drawdown or tailwater encroachment.

POWER. The time rate at which work is done. If an amount of work (W) is done in time (t) the power or rate of doing work is $P = W/t$. Power will be obtained in watts if W is expressed in joules and t in seconds.

PUMPED HYDROELECTRIC STORAGE. The only means now available for the large-scale storage of electrical energy. Excess electricity produced during periods of low demand is used to pump water up to a reservoir. When demand is high, the water is released to operate a hydroelectric generator. Pumped energy storage only returns about 66 percent of the electrical energy put into it, but costs less than an equivalent generating capacity.

PUMPED STORAGE PLANT. A hydroelectric power plant which generates electric energy for peak load use by utilizing water pumped into an elevated storage reservoir during off-peak periods.

R-VALUE. Thermal resistance; computed by the conductivity divided into one. The measure of resistance to heat flow.

RECLAMATION. Act or process of reclaiming; for example, strip-mined land should be reclaimed--replanted and leveled.

RENEWABLE RESOURCES. Nondepletable resources; for example, the sun.

RESERVES. The amount of a natural resource known to exist and expected to be recovered by present-day techniques.

RESOURCES. The estimated total quantity of a natural resource such as minerals in the ground; includes undiscovered mineral reserves.

SECOND LAW OF THERMODYNAMICS. One of the two "limit" laws which govern the conversion of energy. Referred to here as the "heat tax", it can be stated in several equivalent forms, all of which describe the inevitable passage of some energy from a useful to a less useful form in any energy conversion.

SOLAR CELL. A photovoltaic cell which converts radiant energy from the sun into electrical energy.

SOLAR ENERGY. Radiation energy from the sun falling upon the earth's surface.

SOLID WASTE. Useless, unwanted, or discarded material with insufficient liquid content to be free flowing.

STATIC ELECTRICITY. Electricity at rest.

STEAM-ELECTRIC PLANT. A plant in which the prime movers (turbines) connected to the generators are driven by steam.

STOCKPILE. A storage pile or reserve supply of an essential raw material; for example, coal is stockpiled in the open air for storage purposes.

STRIP-MINING. A process in which rock and topsoil strata overlying ore or fuel deposits are scraped away by mechanical shovels. Also known as surface mining.

TECHNOLOGY. Applied science.

THERMAL EFFICIENCY. The ratio of the electric power produced by a power plant to the amount of heat produced by the fuel; a measure of the efficiency with which the plant converts thermal to electrical energy.

THERMAL ENERGY. The total potential and kinetic energy associated with the random motions of the particles of a material.

THERMAL PLANT. A generating plant which converts heat energy to electrical energy. Such plants may burn coal, gas, oil, or use nuclear energy to produce thermal energy.

THERMAL POLLUTION. Degradation of water quality by the introduction of a heated effluent. Primarily a result of the discharge of cooling waters from industrial processes, particularly from electrical power generation.

THERMODYNAMICS. The science and study of the relationship between heat and mechanical work.

TRANSMISSION. The act or process of transporting electric energy in bulk from a source or sources of supply to other utility systems.

TRANSMISSION LINES. Wires or cables through which high voltage electric power is moved from point to point.

TURBINE. A motor, the shaft of which is rotated by a stream of water, steam, air, or fluid from a nozzle and forced against the blades of a wheel.

VAPOR. The words vapor and gas are often used interchangeably. Vapor is more frequently used for a substance which, though present in the gaseous phase, generally exists as a solid or liquid at room temperature. Gas is more frequently used for a substance that generally exists in the gaseous phase at room temperature.

VAPORIZATION. The change of a substance from a liquid or solid state to the gaseous state. One of three contributing factors to air pollution; the other are attrition and combustion.

VOLT. The unit of electromotive force. It is the difference in potential required to make a current flow through a resistance.

VOLTAGE. The amount of force employed to move a quantity of electricity; measured in volts.

WATER VAPOR. Water in the form of a gas.

WATT (W). A unit of measure for electric power equal to the transfer of one joule of energy per second. The watt is the unit of power most often associated with electricity (1 horsepower = 746 watts) determined by multiplying required volts by required amperes (volts x amps = watts).

WEATHERSTRIPPING. Reduces the rate of air infiltration by making sure that all doors and windows fit their frames snugly.

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